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(FILE 'HOME' ENTERED AT 09:15:59 ON 19 SEP 2006)

FILE 'REGISTRY' ENTERED AT 09:16:08 ON 19 SEP 2006

- L1 23 S 60-23-1 OR 60-24-2 OR 74-93-1 OR 78-10-4 OR 107-03-9 OR 107-96-0  
OR 109-79-5 OR 111-31-9 OR 111-88-6 OR 112-55-0 OR 112-90-3 OR 143-  
10-2 OR 507-09-5 OR 928-98-3 OR 1191-08-8 OR 1191-43-1 OR 1191-62-4  
OR 1455-21-6 OR 1892-29-1 OR 2079-95-0 OR 2757-37-1 OR 2885-00-9 OR  
2917-26-2
- L2 20 S 3446-89-7 OR 3489-28-9 OR 4420-74-0 OR 5332-52-5 OR 6954-27-4 OR  
13373-97-2 OR 14814-09-6 OR 14866-33-2 OR 17689-17-7 OR 19484-26-5  
OR 30774-15-3 OR 31521-83-2 OR 33528-63-1 OR 34451-26-8 OR 55453-  
24-2 OR 65062-26-2 OR 69839-68-5 OR 71310-21-9 OR 73391-27-2 OR  
74328-61-3
- L3 14 S 82001-53-4 OR 94805-33-1 OR 115646-13-4 OR 127087-36-9 OR 130727-  
44-5 OR 156125-36-9 OR 157222-22-5 OR 171195-91-8 OR 176109-93-6 OR  
178561-30-3 OR 186104-89-2 OR 186209-32-5 OR 216067-45-7 OR 558471-  
93-5
- FILE 'CA' ENTERED AT 09:17:20 ON 19 SEP 2006
- L4 196541 S (PARTICLE OR PARTICULATE OR COLLOID? OR NANOPART? OR CLUSTER OR  
NANOCRYST? OR NANOCLOST? OR SOL OR NANOMATERIAL OR SUPERLATTICE)  
(5A) (METAL OR METALLIC OR GOLD OR AU OR SILVER OR AG OR COPPER OR  
CU OR PLATINUM OR PT OR PALLADIUM OR PD OR TIN OR SN OR NICKEL OR  
NI)
- L5 18953 S L4 (7A) (ENCAPSUL? OR MONOLAYER OR SAM OR SELFASSEMB? OR SELF  
ASSEMB? OR PROTECT? OR TERMINAT? OR CAPPED OR CAPPING(1A) LAYER OR  
PASSIVAT? OR FUNCTIONALI? OR COATED OR COATING)
- L6 9530 S L4 AND (THIOL OR ALKANETHIOL OR THIOPHENE OR THIOLATE? OR LIGAND  
OR DITHIOL OR ALKANETHIOLATE OR ALKANEDITHIOL? OR  
ALKYLSILOXANETHIOL?)
- L7 3149 S L4 AND L1-3
- L8 485 S L4 AND (PROPANETHIOL? OR TRIDECANETHIOL? OR THIOPHENEETHANETHIOL?  
OR THIENYL(1W) DODECANETHIOL? OR MERCAPTOPROPANOIC OR DECANETHIOL?  
OR PENTANEDITHIOL? OR NONANEDITHIOL? OR MERCAPTOHEXADECANOIC OR  
MERCAPTOUNDECANOIC OR HYDROXYETHYL(1W) DISULFIDE OR MERCAPTOETHANOL  
OR MERCAPTOHEXANOIC)
- L9 1258 S L4 AND (METHANETHIOL? OR DODECYLTHIOL? OR ETHANETHIOIC OR  
MERCAPTOPROPYL(1W) TRIMETHOXYSILANE OR DODECANETHIOL? OR OLEYLAMINE  
OR NONANETHIOL? OR TETRAOCTYLAMMONIUM OR OCTANETHIOL? OR  
OCTANEDITHIOL? OR HEXANETHIOL? OR UNDECANETHIOL? OR TRIETHOXYSILYL  
(1W) PROPANETHIOL?)
- L10 402 S L4 AND (DODECYL(1W) DISULFIDE OR OCTADECANETHIOL OR  
MERCAPTobenzoate OR MERCAPTOPROPYLTRIMETHOXYSILANE OR  
HEXANEDITHIOL? OR XYLENEDITHIOL? OR DODECANEDITHIOL? OR  
PERFLUOROHEXYL(1W) ETHANETHIOL? OR MERCAPTOUNDECANOATE OR  
MERCAPTOOCTANOIC OR MERCAPTODODECANOIC OR MERCAPTO(1W) DECANOL)
- L11 204 S L4 AND (HEXADECANETHIOL OR BUTANETHIOL? OR BIPHENYLDITHIOL? OR  
BENZENEDIMETHANETHIOL? OR THIOETHANOLAMINE OR  
METHYLMERCAPTobenZALDEHYDE OR BUTANE DITHIOL? OR TETRADECANETHIOL?  
OR EICOSANETHIOL?)
- L12 1082 S L6-11 AND (METAL OR METALLIC OR GOLD OR AU OR SILVER OR AG OR  
COPPER OR CU OR PLATINUM OR PT OR PALLADIUM OR PD OR TIN OR SN OR  
NICKEL OR NI OR SURFACE) (2A) (BOUND OR CONFINED OR IMMOBILI? OR  
LINKED)

L13 1313 S L4 AND(SUBSTITUT? OR EXCHANG?) (2A)REACTION  
 L14 29661 S L4 AND(STABILI? OR AGGREGAT? OR (H2O OR WATER) (1A)SOLUB?)  
 L15 2435 S L5 AND L6-11  
 L16 4261 S L12-13,L15  
 L17 1338 S L16 AND PY<1998  
 L18 226 S L14 AND L17  
 L19 936 S L17 AND(GOLD OR AU OR SILVER OR AG OR COPPER OR CU OR PLATINUM OR  
 PT OR PALLADIUM OR PD OR TIN OR SN OR NICKEL OR NI)  
 L20 703 S L19 NOT CATALY?  
 L21 204 S L20 AND(ENCAPSUL? OR MONOLAYER OR SAM OR SELFASSEMB? OR SELF  
 ASSEMB? OR PROTECT? OR TERMINAT? OR CAPPED OR CAPPING(1A)LAYER OR  
 PASSIVAT? OR FUNCTIONALI? OR LINKED)  
 L22 387 S L18,L21  
 L23 332 S L22 NOT(TETRATHIA OR HEXANUCLEAR OR TRINUCLEAR OR SILVER SULFIDE  
 OR DINUCLEAR OR GROUP 11 OR DECANUCLEAR OR J AGGREGA? OR FE2)  
 L24 4 S L22 NOT L23 AND SELF  
 L25 280 S L23 NOT(POLYACRYL? OR HORMONE OR COBALT OR DECAPP? OR SIEVE OR  
 PIGMENT OR BREAST OR SUPERPARA? OR KETEN? OR BIOTIN OR OCTAHED?)  
 L26 3 S L23 NOT L25 AND SELF ASSEMBL?  
 L27 241 S L25 NOT(CADMIUM OR MOLYBDENUM OR OSMIUM OR WASTE OR WATER PURIF?  
 OR METAL COMPLEX OR PICKLING)  
 L28 7 S L25 NOT L27 AND(LAYER(1W)LAYER OR CHEMISOR? OR AU CLUSTER)  
 L29 211 S L27 NOT(PYRROLE OR PHTHALO? OR POLYMER COMPOSITE OR SUB OR H2 D2  
 OR HYDROGEN DEUTERIUM OR SULFOBENZYL OR DOMAIN OR LAMINAT?)  
 L30 2 S L27 NOT L29 AND CAPPED  
 L31 157 S L29 NOT(XEROGEL OR FERRIC OR RUBEANIC OR MONOXIDE OR IRON OR SIO2  
 COATING OR CYTOCHROME OR COKING OR POLEMIC OR RHODIUM OR ZEOLITE OR  
 GALLIUM OR POLYASPAR? OR SOLGEL OR SOL GEL)  
 L32 2 S L29 NOT L31 AND(ELECTRONIC CONDUCTION OR UNDER MONOLAYER)  
 L33 133 S L31 NOT(PBO2 OR ALKALI METAL OR LIPOSOME OR NAFION OR ANHYDRIDE  
 OR RAIN OR ORGANIC MATTER OR BAR CODE OR ION EXCHANGE OR TITANIUM  
 OR POLYAZO OR METALLOPOR? OR COLORATION)  
 L34 151 S L24,L26,L28,L30,L32-33

=> d bib,ab l34 1-151

L34 ANSWER 17 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 127:226691 CA  
 TI pH dependent changes in the optical properties of carboxylic acid  
 derivatized **silver colloidal particles**  
 AU Sastry, Murali; Mayya, K. S.; Bandyopadhyay, K.  
 CS Materials Chemistry Division, National Chemical Laboratory, Pune, 411  
 008, India  
 SO Colloids and Surfaces, A: Physicochemical and Engineering Aspects (1997,  
 July), 127(1-3), 221-228  
 AB The optical properties of **Ag colloidal particles** derivatized using an  
 arom. bifunctional mol., 4-carboxythiophenol, are presented. The  
 capping mol. forms a **thiolate** bond with the **Ag colloidal particle**  
 yielding a carboxylic acid terminal **functionality** which may then be  
 charged to varying degrees by controlling the **Ag hydrosol pH**. A  
 progressive red shift together with a damping and broadening of the  
 surface plasmon feature ( $\lambda_{max}$ ) of the **Ag particles** is obsd. as the pH is  
 reduced 10-3. **Ag colloidal particles** with high surface coverage of the

bifunctional mol. showed negligible flocculation with time at high soln. pH indicating good **stabilization** due to Coulombic repulsive interactions. At low pH, considerable flocculation was obsd. even for high surface coverage due to lack of Coulombic **stabilization**. A tentative explanation is put forward to explain changes in the optical properties of the colloidal particles due to variation in the pH dependent surface charge of the particles.

L34 ANSWER 18 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 127:213551 CA

TI Single-electron transistor using a molecularly **linked gold colloidal particle** chain

AU Sato, Toshihiko; Ahmed, Haroon; Brown, David; Johnson, Brian F. G.

CS Hitachi Cambridge Lab., Cavendish Lab., Hitachi Europe Ltd., Cambridge, CB3 0HE, UK

SO Journal of Applied Physics (1997), 82(2), 696-701

AB By applying a **dithiol** (1,6-**hexanedithiol**) treatment, it was obsd. that a submonolayer of **gold colloidal particles** deposited by using an aminosilane adhesion agent [i.e., 3-(2-aminoethylamino) propyltrimethoxysilane] transform themselves into chains consisting of a few **gold colloidal particles**. In those chains, **gold colloidal particles** are believed to be **linked** by alkane chains derived from the **dithiol** mols. The particle chain was formed on an SiO<sub>2</sub> substrate with source, drain, and gate metal electrodes defined by electron beam lithog. It was obsd. that the **gold particle** chain bridged a gap between the source and drain forming a single-electron transistor with a multi-tunnel junction in the particle chain. The electron conduction through the chain exhibited a clear Coulomb staircase and the periodic conductance oscillation as a function of gate voltage. These measurement results corresponded closely to the results of a simulation based on the orthodox theory.

L34 ANSWER 21 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 127:167265 CA

TI On the **Stability** of Carboxylic Acid Derivatized **Gold Colloidal Particles**: The Role of **Colloidal** Solution pH Studied by Optical Absorption Spectroscopy

AU Mayya, K. S.; Patil, V.; Sastry, Murali

CS Materials Chemistry Division, National Chemical Laboratory, Pune, 411 008, India

SO Langmuir (1997), 13(15), 3944-3947

AB Results of an investigation into the influence of hydrosol pH on the optical properties of **gold colloidal particles capped** with a novel arom. bifunctional mol., 4-carboxythiophenol (4-CTP), are presented. Changes in the optical properties of the carboxylic acid derivatized clusters have been interpreted as arising due to flocculation of the clusters and quantified using a "flocculation parameter" C. Weisbecker et al. (1996). It is obsd. that there is a large fall in the flocculation parameter above hydrosol pH = 4 which then is const. above pH = 7. This indicates that the cluster distribution is very stable at high pH due to complete charging of the clusters and maximization of the repulsive electrostatic interaction. Contact angle titrn. measurements on a **self-assembled monolayer** of 4-CTP on **gold** revealed an analogous trend with the contact

angle falling above pH = 6 and then remaining const. above pH = 8. This indicates that **monolayer** formation of 4-CTP on planar and curved surfaces is similar. However, these results are at variance with earlier similar studies on carboxylic acid **functionalized alkanethiols** where a decrease in the flocculation parameter was obsd. for intermediate pH values (3 to 7) C. Weisbecker et al. (1996) and a possible explanation is presented.

- L34 ANSWER 24 OF 151 CA COPYRIGHT 2006 ACS on STN  
AN 127:88465 CA  
TI Observation of a Coulomb staircase in electron transport through a molecularly **linked** chain of **gold colloidal particles**  
AU Sato, T.; Ahmed, H.  
CS Hitachi Cambridge Laboratory, Hitachi Europe Limited, Cambridge, CB3 0HE, UK  
SO Applied Physics Letters (1997), 70(20), 2759-2761  
AB Submonolayer **gold colloidal particles** were deposited by using aminosilane [3-(2-aminoethylamino)propyltrimethoxysilane] as an adhesion agent on the substrate. These submonolayer particles transform themselves into short chains of a few **gold colloidal particles** after a subsequent **dithiol** (1,6-hexanedithiol) treatment and an addnl. **gold colloidal particle** deposition. These chains bridged a gap that was formed between source and drain metal electrodes defined by electron beam lithog.; thus realizing a quasi one dimensional current path between the source and drain. The device exhibited a clear Coulomb staircase at both 4.2 and 77 K.
- L34 ANSWER 33 OF 151 CA COPYRIGHT 2006 ACS on STN  
AN 126:298027 CA  
TI Synthesis of Highly Monodisperse **Silver Nanoparticles** from AOT Reverse Micelles: A Way to 2D and 3D Self-Organization  
AU Taleb, A.; Petit, C.; Pileni, M. P.  
CS Laboratoire SRSI URA CNRS 1662, Universite P. et M. Curie, Paris, 75005, Fr.  
SO Chemistry of Materials (1997), 9(4), 950-959  
AB A simple method is used to prep. highly monodispersed **silver nanoparticles** in the liq. phase, which starts from an initial synthesis in **functionalized** AOT reverse micelles. To narrow the particle size distribution from 43% to 12.5% in dispersion, the particles are extd. from the micellar soln. The size-selected pptn. method is used. The decrease in polydispersity of the **silver nanoparticles** is followed by transmission electron microscopy, by UV-vis spectroscopy, and by small-angle X-ray scattering. The nanocrystallites dispersed in hexane are deposited on a support. A **monolayer** made of nanoparticles with spontaneous hexagonal organization is obsd. The immersion of the support on the soln. yields to the formation of organized multilayers arranged as microcrystals in a face-centered cubic structure.
- L34 ANSWER 46 OF 151 CA COPYRIGHT 2006 ACS on STN  
AN 126:123065 CA  
TI **Alkanethiol** Molecules Containing an Aromatic Moiety **Self-Assembled** onto **Gold Clusters**  
AU Johnson, S. R.; Evans, S. D.; Mahon, S. W.; Ulman, A.

CS Department of Physics and Astronomy and School of Materials, Leeds University, Leeds, LS2 9JT, UK

SO Langmuir (1997), 13(1), 51-57

AB **Alkanethiol** mols. contg. a polar arom. group (C<sub>22</sub>H<sub>45</sub>-SO<sub>2</sub>-C<sub>6</sub>H<sub>4</sub>-O-C<sub>4</sub>H<sub>8</sub>-SH) were used to **stabilize Au clusters** formed in a 2-phase system (M. Brust et al., 1994). The **Au nanoparticles** were studied by using TEM, FTIR, UV/visible, and XPS and compared to a **monolayer** formed from the same **alkanethiol** mol. on a planar surface. Surfactant-coated nanoparticles indeed are formed and the incorporation of a polar arom. group into the **thiol** mol. does not hinder the **self-assembling** process.

L34 ANSWER 47 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 126:123056 CA

TI Chemical deposition of **silver nanoclusters** on **self-assembled organic monolayers**. A strategy to contact individual molecules

AU Grummt, U.-W.; Geissler, M.; Schmitz-Huebsch, Th.

CS Institut fuer Physikalische Chemie der Friedrich-Schiller-Universitaet Jena, Lessingstrasse 10, D 07743 Jena, Germany

SO Chemical Physics Letters (1996), 263(3,4), 581-584

AB **Self-assembled monolayers (SAMs)** on Au (111) surfaces were prep'd. consisting of a matrix of 1-**dodecanethiol** and a mercaptan as a host which was **terminated** by a 4-electron reducing agent. Upon treatment with ammoniated AgNO<sub>3</sub> solns., **Ag nanoclusters** are generated on the **SAM** surface. Phys. development allows enlargement of the clusters.

L34 ANSWER 48 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 126:111585 CA

TI **Self-assembly** of a quantum dot **superlattice** using molecularly **linked metal clusters**

AU Mahoney, W. J.; Bielefeld, J. D.; Osifchin, R. G.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.

CS School Chemical Engineering, Purdue University, West Lafayette, IN, 47907, USA

SO Proceedings of the Science and Technology of Atomically Engineered Materials, Richmond, Oct. 30-Nov. 4, 1995 (1996), Meeting Date 1995, 57-65. Editor(s): Jena, Puru; Khanna, Shiv N.; Rao, B. K. Publisher: World Scientific, Singapore, Singapore.

AB We report on a synthesis strategy for fabrication of close-packed planar arrays of nanometer-diam. **metal clusters** that are covalently **linked** by org. mol. wires. The **clusters** are **gold** single crystals, each **encapsulated** by a **monolayer** of **dodecanethiol** mols. A colloidal suspension of these clusters in mesitylene is spread onto a flat, insulating substrate. On evapn. of the mesitylene the clusters **self-assemble** to form a close-packed **monolayer**. This two-dimensional cluster array is crosslinked by immersing it in an acetonitrile soln. contg. conjugated di-**thiol** or di-isonitrile mols. which serve as mol. wires. They displace some of the **dodecanethiol** mols. and form well defined tunnel junctions between adjacent clusters. This crosslinked network is a two-dimensional **superlattice** of **metal** quantum dots. When the clusters used to synthesize the network have diams. <2 nm, it is predicted that this superlattice will exhibit Coulomb blockade effects at room temp.

L34 ANSWER 50 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 126:81412 CA  
 TI Fabricating Surface Enhanced Raman Scattering (SERS)-active substrates by assembling **colloidal Au nanoparticles** with **self-assembled monolayers**  
 AU Wang, J.; Zhu, T.; Tang, M.; Cai, S. M.; Liu, Z. F.  
 CS Cent. Intelligent Mater. Res., Peking Univ., Beijing, 100871, Peop. Rep. China  
 SO Japanese Journal of Applied Physics, Part 2: Letters (1996), 35(10B), L1381-L1384  
 AB A simple method for fabricating SERS-active substrates with **colloidal Au nanoparticles** is reported. Spontaneous adsorption of HSCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub> on Au-evapd. glass led to a **self-assembled monolayer** with an amino-terminated surface, on which mono-dispersed **colloidal Au nanoparticles** were assembled into a two-dimensional array. Thus-prepd. substrates are SERS-active, evidence by the enhanced Raman scattering from BPE and an azobenzene deriv. The SERS enhancement factor is  $3 \times 10^3$ . Raman mapping and AFM imaging disclosed the good uniformity of the particle distribution on the surface on micrometer scale.

L34 ANSWER 54 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 125:257889 CA  
 TI The **self-assembly** of gold and SCD **nanoparticle** multilayer structures studied by quartz crystal microgravimetry  
 AU Brust, M.; Etchenique, R.; Calvo, E. J.; Gordillo, G. J.  
 CS INQUIMAE, Univ. de Buenos Aires, Buenos Aires, 1428, Argent.  
 SO Chemical Communications (Cambridge) (1996), (16), 1949-1950  
 AB The **self-assembly** of nanometer-sized Au and CdS **particles** to well defined multilayer structures on **dithiol** derivatized Au surfaces is quant. studied by quartz crystal microgravimetry.

L34 ANSWER 56 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 125:189921 CA  
 TI A DNA-based method for rationally assembling nanoparticles into macroscopic materials  
 AU Mirkin, Chad A.; Letsinger, Robert L.; Mucic, Robert C.; Storhoff, James J.  
 CS Dep. Chem., Northwestern Univ., Evanston, IL, 60208, USA  
 SO Nature (London) (1996), 382(6592), 607-609  
 AB **Colloidal particles** of metals and semiconductors have potentially useful optical, optoelectronic and material properties that derive from their small (nanoscopic) size. These properties might lead to applications including chem. sensors, spectroscopic enhancers, quantum dot and nanostructure fabrication, and microimaging methods. A great deal of control can now be exercised over the chem. compn., size and polydispersity of colloidal particles, and many methods have been developed for assembling them into useful **aggregates** and materials. Here we describe a method for assembling **colloidal gold nanoparticles** rationally and reversibly into macroscopic **aggregates**. The method involves attaching to the surfaces of two batches of 13-nm **gold particles** non-complementary DNA oligonucleotides **capped** with **thiol** groups, which bind to **gold**. When we add to the soln. an oligonucleotide duplex with 'sticky ends' that are complementary to the two grafted sequences, the nanoparticles **self-assemble** into **aggregates**. This

assembly process can be reversed by thermal denaturation. This strategy should now make it possible to tailor the optical, electronic and structural properties of the colloidal **aggregates** by using the specificity of DNA interactions to direct the interactions between particles of different size and compn.

L34 ANSWER 57 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 125:178469 CA

TI **Nanocrystal gold** molecules

AU Whetten, Robert L.; Khoury, Joseph T.; Alvarez, Marcos M.; Murthy, Srihari; Vezmar, Igor; Wang, Z. L.; Stephens, Peter W.; Cleveland, Charles L.; Luedtke, W. D.; Landman, Uzi

CS Sch. Phys. Chem., Georgia Inst. Technol., Atlanta, GA, 30332, USA

SO Advanced Materials (Weinheim, Germany) (1996), 8(5), 428-33

AB **Au nanocrystals passivated by self-assembled monolayers** of straight-chain alkylthiolate mols. were obtained as highly purified mol. materials of high intrinsic **stability**. Evidence is presented for a predicted discrete sequence of energetically optimal fcc. structures of a truncated octahedral morphol. motif. The nanocrystal materials have a propensity to form extended superlattices.

L34 ANSWER 62 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 125:124691 CA

TI Infrared Spectroscopy of Three-Dimensional **Self-Assembled Monolayers: N-Alkanethiolate Monolayers on Gold Cluster** Compounds

AU Hostetler, Michael J.; Stokes, Jennifer J.; Murray, Royce W.

CS Kenan Laboratories of Chemistry, University of North Carolina, Chapel Hill, NC, 27599-3290, USA

SO Langmuir (1996), 12(15), 3604-3612

AB Transmission IR spectroscopy was used to probe the structure of **alkanethiolate monolayers** adsorbed onto nanometer-sized **gold clusters**. The alkyl chain lengths vary between **propanethiolate** and tetracosanethiolate; specifically the C3, C4, C5, C6, C7, C8, C10, C12, C16, C20, and C24 **alkanethiolates** were examd. as solid suspensions in KBr pellets. It was found that the smaller chain lengths (C3, C4, and C5) are relatively disordered, with large amts. of gauche defects present, and thus most resemble the free alkanes in the liq. state. The longer length **alkanethiolates** are predominantly in the all trans zigzag conformation. There are detectable amts. of near surface gauche defects, the amt. of which decreases with increasing chain length, and a reasonably high percentage of end-gauche defects, the relative amt. of which increases with increasing chain length. Internal gauche defects cannot be detected. A model is proposed to explain these observations, and the data are compared with that collected for **alkanethiolates self-assembled** onto the more traditional two-dimensional systems.

L34 ANSWER 63 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 125:124551 CA

TI Room temperature Coulomb blockade and Coulomb staircase from **self-assembled** nanostructures

AU Andres, R. P.; Datta, S.; Dorogi, M.; Gomez, J.; Henderson, J. I.; Janes, D. B.; Kolagunta, V. R.; Kubiak, C. P.; Mahoney, W.; et al.

CS Sch. CHem. Eng., Purdue Univ., West Lafayette, IN, 47907, USA

SO Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films (1996), 14(3, Pt. 1), 1178-1183

AB The **self-assembly** of well-characterized, nanometer-size **Au clusters** into ordered **monolayer** arrays spanning several microns was achieved. Techniques to insert mol. wires to link adjacent clusters in the **self-assembled** array were developed. "Unit cell" nanostructures formed from individual **Au clusters** supported on a **self-assembled monolayer** film of the double-ended **thiol** mol. p-xylylene- $\alpha,\alpha'$ - **dithiol** show evidence for reproducible single electron effects at room temp. when studied by STM. Ests. for the elec. resistance of a single mol. can be obtained from these measurements. The exptl. values for this resistance are in reasonable agreement with theor. calcns. by using the Landauer approach.

L34 ANSWER 67 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 125:45892 CA

TI "Coulomb staircase" at room temperature in a **self-assembled** molecular nanostructure

AU Andres, Ronald P.; Bein, Thomas; Dorogi, Matt; Feng, Sue; Henderson, Jason I.; Kubiak, Clifford P.; Mahoney, William; Osifchin, Richard G.; Reifenger, R.

CS Sch. Chem. Eng., Purdue Univ., West Lafayette, IN, 47907, USA

SO Science (Washington, D. C.) (1996), 272(5266), 1323-1325

AB Double-ended aryl **dithiols** [ $\alpha,\alpha'$ -xylyldithiol (XYL) and 4,4'-**biphenyldithiol**] formed **self-assembled monolayers (SAMs)** on **gold(111)** substrates and were used to tether nanometer-sized **gold clusters** deposited from a **cluster** beam. An ultrahigh-vacuum scanning tunneling microscope was used to image these nanostructures and to measure their current-voltage characteristics as a function of the sepn. between the probe tip and the **metal cluster**. At room temp., when the tip was positioned over a cluster bonded to the XYL **SAM**, the current-voltage data showed "Coulomb staircase" behavior. These data are in good agreement with semiclassical predictions for correlated single-electron tunneling and permit estn. of the elec. resistance of a single XYL mol. ( $\sim 18 \pm 12 \text{ M}\Omega$ ).

L34 ANSWER 68 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 125:21025 CA

TI **Self-assembled monolayers** of **dithiols**, **diisocyanides**, and **isocyanothiols** on **gold**: 'chemically sticky' surfaces for covalent attachment of **metal clusters** and studies of interfacial electron transfer

AU Henderson, Jason I.; Feng, Sue; Ferrence, Gregory M.; Bein, Thomas; Kubiak, Clifford P.

CS Department of Chemistry, 1393 Brown Laboratory, Purdue University, West Lafayette, IN, 47907, USA

SO Inorganica Chimica Acta (1996), 242(1-2), 115-24

AB The prepn. is reported of **self-assembled monolayers (SAMs)** of the double-ended **dithiols** 4,4'-**biphenyldithiol** and  $\alpha,\alpha'$ -p-xylyldithiol; the double-ended diisocyanides 1,4-phenylenediisocyanide, 4,4'-biphenyldiisocyanide, 4,4'-p-terphenyldiisocyanide, 1,6-diisocyanohexane, 1,12-diisocyanododecane, and 1,4-di(4-isocyanophenylethynyl)-2-ethylbenzene; and a 4-sulfidophenylisocyanide-capped trinuclear **Ni cluster** by direct adsorption or by displacement of



a pre-existing **SAM** of 1-octadecanethiol on Au. The **SAMs** were characterized by using reflection-absorption IR spectroscopy (RAIR), optical ellipsometry, and advancing contact-angle ( $\theta_a$ ) measurements. The substitution chem. of **SAMs** was irreversible. The **dithiols** and aryl diisocyanides formed **SAMs** with only 1 functional group attached to the surface. The **SAMs** of **dithiols** were used to covalently attach nanometer-scale **Au clusters** to the exposed **thiol** surface of the **SAM**. STM was used to image these **immobilized Au clusters**. The diisocyanides were used to covalently anchor trinuclear **Ni clusters**. The **SAM** of the 4-sulfido Ph isocyanide-capped trinuclear **nickel cluster** 4-( $\mu_3$ -iodo)-tris(bis(diphenylphosphino)methane)-trinickel-(isocyano)phenylenesulfide, was studied by cyclic voltammetry. The electron acceptors methylviologen (MV<sup>2+</sup>) and the Me ester of cobaltocenium [CoCpCpCOOMe]<sup>+</sup>[PF<sub>6</sub>]<sup>-</sup> were used to demonstrate rectification in the interfacial electron transfer from **Ni cluster SAM-modified Au electrodes** to the electron acceptors.

L34 ANSWER 71 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:329180 CA

TI Synthesis of a quantum dot **superlattice** using molecularly **linked metal clusters**

AU Osifchin, R. G.; Mahoney, W. J.; Bielefeld, J. D.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.

CS School of Chemical Engineering, Purdue University, West Lafayette, IN, 47907, USA

SO Superlattices and Microstructures (1995), 18(4), 283-9

AB We report on a synthesis strategy for fabrication of close-packed planar arrays of nanometer-diam. **metal clusters** that are covalently **linked** by org. mol. wires. The **clusters** are **gold** single crystals, each **encapsulated** by a **monolayer** of **dodecanethiol** mols. A colloidal suspension of these clusters in mesitylene is spread onto a substrate. On evapn. of the solvent the clusters **self-assemble** to form a close-packed **monolayer**. This cluster network is then crosslinked by immersing the substrate in an acetonitrile soln. contg. a conjugated di-isonitrile mol. (1,4-di(4-isocyanophenylethynyl)2-ethylbenzene). Transmission electron micrographs of the cluster arrays before and after immersion indicate that the diisonitrile mols. partially substitute for the **dodecanethiol** mols. to produce a crosslinked network of clusters joined by the di-isonitrile. The interesting feature of this network is that it represents a 2D **superlattice** of **metal** quantum dots coupled by well defined tunnel junctions. When the **gold clusters** used to synthesize the network have diams. less than approx. 2 nm, it is predicted that this superlattice will exhibit Coulomb blockade effects at room temp.

L34 ANSWER 72 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:329179 CA

TI **Electronic conduction** through 2D arrays of nanometer diameter **metal clusters**

AU Janes, D. B.; Kolagunta, V. R.; Osifchin, R. G.; Bielefeld, J. D.; Andres, R. P.; Henderson, J. I.; Kubiak, C. P.

CS School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, 47907, USA

SO Superlattices and Microstructures (1995), 18(4), 275-82

AB An exptl. study of elec. conduction through arrays of nanometer-diam. **metallic clusters linked** by org. mols. is presented. **Gold clusters**, having diams. of ~4 nm and **encapsulated** by a **monolayer** of **dodecanethiol**, are deposited from soln. on to specially prepd. substrates to form a close-packed cluster **monolayer**. Nearest-neighbors in this 2D array of **encapsulated** clusters are then covalently **linked** using a conjugated org. mol. approx. 2.2 nm in length having isocyanide groups at both ends. In order to allow both elec. characterization and TEM imaging, the cluster arrays are deposited in 500 nm wide gaps between **gold** contacts on a free standing, insulating SiO<sub>2</sub> film. **Electronic conduction** through **linked** 2D arrays approx. 80 clusters in length has been obsd. at room temp. The structure of the arrays and current-voltage relationships for the **linked** arrays are presented.

L34 ANSWER 74 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:271470 CA

TI **Self-assembled monolayers on gold nanoparticles**

AU Badia, Antonella; Singh, Shanti; Demers, Linette; Cuccia, Louis; Brown, G. Ronald; Lennox, R. Bruce

CS Dep. Chem., McGill Univ., Montreal, QC, H3A 2K6, Can.

SO Chemistry--A European Journal (1996), 2(3), 359-63 Published in:  
Angew. Chem., Int. Ed. Engl., 35(5)

AB Phase properties in self-assembled **monolayers (SAMs)** have been addressed here through the synthesis of **gold nanoparticles** of 20-30Å in diam. and fully covered with alkylthiol chains. These **thiol-modified gold nanoparticles** with large surface areas have enabled the **monolayer** film structure to be uniquely characterized by transmission FT-IR spectroscopy, NMR spectroscopy, and differential scanning calorimetry. Our studies reveal that for long-chain **thiols** (≥C<sub>16</sub>), the alkyl chains exist predominantly in an extended, all-trans ordered conformation at 25°C. Furthermore, calorimetry, variable temp. transmission FT-IR spectroscopy, and solid-state <sup>13</sup>C NMR studies have established that a cooperative chain melting process occurs in these alkylated **metal colloids**. How this arises is not immediately evident, given the relation between the extended chain conformation and the geometry of the spherical nanoparticles. Transmission electron microscopy (TEM) reveals that adjacent **gold particles** are sep'd. by approx. one chain length; this suggests that chain ordering arises from an interdigitation of chains on neighboring particles. The thermotropic behavior is sensitive to the alkyl chain length and chain packing d. The alkylated nanoparticles can thus serve as a highly dispersed analog to the much-studied planar **SAMs**.

L34 ANSWER 81 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:42310 CA

TI Novel **gold-dithiol** nano-networks with non-metallic electronic properties

AU Brust, Matias; Bethell, Donald; Schiffrin, David J.; Kiely, Christopher J.

CS Dep. Chem., Univ. Liverpool, Liverpool, L69 3BX, UK

SO Advanced Materials (Weinheim, Germany) (1995), 7(9), 795-7

AB Two new prepn. techniques are reported leading to composite materials, which comprise nanometer sizes **Au particles self-assembled** into a 3-dimensional network by org. **dithiols**. **Au clusters** with particle size of

2.2 nm were prepd. in a 2-phase liq.-liq. system with di-Et ether as solvent and with 1,5-pentanedithiol, 1,6-hexanedithiols, and p-xylylenedithiols as **stabilizing ligands**. Colloids with a size of 8 nm were prepd. using toluene as solvent without **thiol** and a subsequent reaction with the **dithiols**. The electronic properties are nonmetallic and adjustable via particle size and interparticle spacing depending on the **dithiol**.

L34 ANSWER 83 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 124:16132 CA

TI First steps towards ordered **monolayers** of **ligand-stabilized gold clusters**

AU Peschel, Stefanie; Schmid, Guenter

CS Inst. Anorg. Chem., Univ., Essen, D-45117, Germany

SO Angewandte Chemie, International Edition in English (1995), 34(13/14), 1442-3

AB The authors synthesized largely ordered **monolayers** of **ligand-stabilized Au55** clusters for the 1st time by **self-assembly** with the aid of polyelectrolytes. The [Au55(PPh3)12Cl6] cluster could be used, so the PPh3 **ligand** was replaced with PPh2(m-C6H4SO3H). A freshly prepd. layer of polyethylenimine (PEI) on mica was immersed in a soln. contg. the Au55 clusters and the strong interaction between imino and sulfonic groups yielded a strongly adhering **monolayer**. The AFM images indicated relatively closely packed layers with < 5 % of the surface uncovered or disordered. These structures can be used to study electronic transitions in 2-dimensional quantum dot arrangements sepd. by **ligand** shells (spaced 1.4 nm apart). The authors' method can also be used to fabricate sandwich structures since the Au55 cluster **monolayer** can be coated with PEI.

L34 ANSWER 86 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 123:94218 CA

TI Organization of **Au Colloids** as **Monolayer** Films onto ITO Glass Surfaces: Application of the **Metal Colloid** Films as Base Interfaces To Construct Redox-Active **Monolayers**

AU Doron, Amihod; Katz, Eugenii; Willner, Itamar

CS Institute of Chemistry, Hebrew University of Jerusalem, Jerusalem, 91904, Israel

SO Langmuir (1995), 11(4), 1313-17

AB **Gold colloid** films are organized on In Sn oxide (ITO) surfaces by using (aminopropyl)siloxane or (mercaptopropyl)siloxane as base **monolayer** for the deposition of the **metal colloid**. Different **Au colloids** (ranging in **particles** of diams. 25, 30, 35, and 120 nm) were deposited on the **monolayer**-modified ITO surfaces. For the small **particles** (25 nm), an almost continuous **Au colloid** film is formed with interparticle spacing of 10-25 nm. The surface coverage of the **Au colloid** on the (aminopropyl)siloxane **monolayer** is higher than that for the (mercaptopropyl)siloxane-modified ITO. The **Au colloid** films provide active surfaces for the **self-assembly** of redox-active **thiolate monolayers**. 8-(N-Methyl-4,4'-bipyridinyl)octanoic acid was covalently **linked** to a cystamine **monolayer** assembled on the **Au colloids**. For the 25 nm **Au colloid**, the surface coverage by the redox active unit ( $6.8 \times$

10<sup>-10</sup> mol cm<sup>-2</sup>) is ~ 12-fold higher than that of the (aminopropyl) siloxane **monolayer**-modified ITO (lacking the Au film). The surface coverages of the Au **colloid** films by the bipyridinium **monolayers** increase as the colloid particle sizes decrease.

L34 ANSWER 87 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 123:18732 CA

TI **Self-assembled metal colloid monolayers**: an approach to SERS substrates  
AU Freeman, R. Griffith; Grabar, Katherine C.; Allison, Keith J.; Bright, Robin M.; Davis, Jennifer A.; Guthrie, Andrea P.; Hommer, Michael B.; Jackson, Michael A.; Smith, Patrick C.; et al.

CS Division Science, Northeast Missouri State University, Kirksville, MO, 63501, USA

SO Science (Washington, D. C.) (1995), 267(5204), 1629-31

AB The **self-assembly** of monodisperse Au and Ag **colloid particles** into **monolayers** on polymer-coated substrates yields macroscopic surfaces that are highly active for surface-enhanced Raman scattering (SERS). Particles are bound to the substrate through multiple bonds between the **colloidal metal** and functional groups on the polymer (e.g., cyanide (CN), amine (NH<sub>2</sub>), **thiol** (SH)). Surface evolution (which can be followed in real time by UV-visible spectroscopy and SERS) can be controlled to yield high reproducibility on both the nanometer and the centimeter scales. On conducting substrates, colloid **monolayers** are electrochem. addressable and behave like a collection of closely spaced microelectrodes. These favorable properties and the ease of **monolayer** construction suggest a widespread use for **metal colloid**-based substrates.

L34 ANSWER 89 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 122:320132 CA

TI **Gold Particulate Film Formation under Monolayers**

AU Yi, Kyunghye C.; Mendieta, Victor Sanchez; Castanares, Rafael Lopez; Meldrum, Fiona C.; Wu, Changjun; Fendler, Janos H.

CS Department of Chemistry, Syracuse University, Syracuse, NY, 13244-4100, USA

SO Journal of Physical Chemistry (1995), 99(24), 9869-75

AB **Gold nanoparticulate** films were generated **under monolayers**, prep'd. from octadecyl mercaptan (1), N,N'-dioctadecyl-N,N'-dithioethylammonium bromide (2), and N,N'-dioctadecyl-N,N'-dimethylammonium bromide (3), by the exposure of aq. HAuCl<sub>4</sub> to carbon monoxide and to steady-state irradiation by a 150-W xenon lamp. Absorption spectrophotometric and transmission electron microscopic investigations of the **gold particulate** films, transferred to solid substrates, indicated the marked influence of the surfactants used to form the **monolayer**. Those prep'd. **under monolayer** 1 had a broad absorption max. at 580 nm and diams. between 3 and 50 nm. Those formed **under monolayer** 2 were highly dense and had an absorption max. at 564 nm. **Gold particles** formed **under monolayer** 3 had a narrow size distribution with a mean diam. of 10 nm and had a broad absorption max. at 574 nm. Annealing the **gold particulate** films at high temp. decreased their absorption bandwidth and shifted their max. to higher energy.

L34 ANSWER 92 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 122:139658 CA  
TI Ultra-thin particulate films prepared from **capped** and uncapped reverse-micelle-entrapped **silver particles**  
AU Meldrum, Fiona C.; Kotov, Nicholas A.; Fendler, Janos H.  
CS Dep. Chem., Syracuse Univ., Syracuse, NY, 13244-4100, USA  
SO Journal of the Chemical Society, Faraday Transactions (1995), 91(4), 673-80  
AB The formation of thin **particulate** films from **silver nanoparticles**, generated by the sodium borohydride redn. of aq. **silver** nitrate within aerosol-OT [AOT; sodium bis(2-ethyl-1-hexyl) sulfosuccinate] reverse micelles in 2,2,4-trimethylpentane(isooctane), is described. The **silver nanoparticles** were dispersed on a water subphase in a Langmuir trough and the structure of the ultra-thin films formed was investigated by using Brewster-angle microscopy (BAM), transmission electron microscopy (TEM) and reflectivity measurements. **Silver nanoparticles** were also successfully '**capped**' by **octadecanethiol** and, after isolation, could be readily redispersed in chloroform. The ultra-thin **particulate** films of the **capped silver nanoparticles** were highly uniform and displayed excellent reproducibility, while the films formed from the reverse-micelle solns. were somewhat less reproducible.

L34 ANSWER 95 OF 151 CA COPYRIGHT 2006 ACS on STN  
AN 121:120062 CA  
TI Competitive **self-assembly** and electrochemistry of some ferrocenyl-n-**alkanethiol** derivatives on **gold**  
AU Creager, Stephen E.; Rowe, Gary K.  
CS Department of Chemistry, Indiana University, Bloomington, IN, 47405, USA  
SO Journal of Electroanalytical Chemistry (1994), 370(1-2), 203-11  
AB Three ferrocenyl-**alkanethiol** derivs. with different functional groups linking ferrocene to an **alkanethiol** chain were synthesized and characterized electrochem. in bulk soln. and in **self-assembled monolayer** films on **gold** electrodes. Relative affinities of the ferrocenyl-**alkanethiols** and of the corresponding n-**alkanethiols** for the electrode surface were evaluated by the competitive **self-assembly** method. The affinity of the ferrocenyl-**alkanethiols** for the surface, relative to that of the corresponding **alkanethiols**, is a function of the polarity of the functional group linking ferrocene to the **alkanethiol** chain. In general, nonpolar linking groups (methylene) show a stronger affinity for the surface than do polar groups (carboxamides) and esp. charged groups (quaternary ammonium salts). It is postulated that electrostatic effects are critically important during **self-assembly**. Redox potentials for the 3 ferrocenyl-**alkanethiol** derivs. scale approx. with the electron donating/withdrawing effects of the functional groups on the cyclopentadiene rings. However, redox potentials for the **surface-confined** mols. are consistently more pos. than for the identical mols. in bulk soln.

L34 ANSWER 96 OF 151 CA COPYRIGHT 2006 ACS on STN  
AN 121:8262 CA  
TI Palladium(0)-catalyzed substitution of allylic substrates in an aqueous-organic medium  
AU Blart, Errol; Genet, Jean Pierre; Safi, Mohamed; Savignac, Monique;

Sinou, Denis  
 CS Lab. Synth. Org., Ec. Natl. Super. Chim. Paris, Paris, 75231, Fr.  
 SO Tetrahedron (1994), 50(2), 505-14  
 AB A **palladium(0)-water sol.** catalyst prepd. in situ from **palladium** acetate and the sulfonated triphenylphosphine  $P(C_6H_4-m-SO_3Na)_3$  (or tppts) is an efficient catalyst for allylic substitution with various carbon and heteronucleophiles in an aq.-org. medium, allowing for a very easy sepn. of the product(s) and the recycling of the catalyst.

L34 ANSWER 101 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 119:284752 CA  
 TI Solid state magic angle spinning carbon-13 and phosphorus-31 NMR of organic **ligand stabilized** high nuclearity **metal clusters**.  $^{13}C$  and  $^{31}P$  MAS on **metal cluster** compounds  
 AU Kolbert, A. C.; de Groot, H. J. M.; van der Putten, D.; Brom, H. B.; de Jongh, L. J.; Schmid, G.; Krautscheid, H.; Fenske, D.  
 CS Gorlaeus Lab., Leiden Univ., Leiden, 2300 RA, Neth.  
 SO Zeitschrift fuer Physik D: Atoms, Molecules and Clusters (1993), 26 (Suppl.), 24-6  
 AB  $^{13}C$  and  $^{31}P$  solid state NMR measurements on the org. **ligands** in ligated  $Au_{55}$ ,  $Ni_8$ ,  $Pt_{309}$ ,  $Cu_{36}$  and  $Cu_{70}$  clusters are reported. The **ligands** behave like diamagnetic org. mols., giving rise to relatively narrow lines with excellent cross-polarization efficiency. The resonance lines of the nuclei directly **bound** to the **metal** core are systematically broadened in the conducting compds. No pronounced Knight shifts or evidence of metallic-like relaxation were obsd. These results support a model for the elec. conduction involving tunneling between metal cores with the **ligands** playing the role of a tunneling barrier.

L34 ANSWER 102 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 119:279701 CA  
 TI Preparation of ordered colloid **monolayers** by electrophoretic deposition  
 AU Giersig, Michael; Mulvaney, Paul  
 CS Abt. Photochem., Hahn-Meitner Inst., Berlin, W-1000, Germany  
 SO Langmuir (1993), 9(12), 3408-13  
 AB Citrate- and **alkanethiol-stabilized Au colloids** were deposited electrophoretically on carbon-coated **Cu** grids. The colloid particles form ordered **monolayers**, and the core-to-core interparticle spacing is detd. by the size of the alkane chains on the **stabilizers** used in the prepn. of the sols. In the case of longer alkane chains, some interpenetration of the chains occurs when the **Au particles** form **monolayers**. When the **Au sols** are **stabilized** by Na 3-thiopropionate, they can be coagulated and peptized reversibly by cycling the pH between 3 and 7. The method was used to form ordered **monolayers** and bilayers of latex particles.

L34 ANSWER 120 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 115:182381 CA  
 TI A new supported palladium catalyst for the partial hydrogenation of cyclodienes  
 AU Wang, Yuan; Liu, Hanfan  
 CS Inst. Chem., Chin. Acad. Sci., Beijing, 100080, Peop. Rep. China  
 SO Fenzi Cuihua (1991), 5(2), 189-92

LA Chinese

AB A novel thioether-contg. silica-supported metallic palladium catalyst was prepd. via the coordination capture of polymer-**protective palladium metal colloid** with silica gel bearing thioether **ligands**. The catalyst shows high catalytic activity, **stability** and good selectivity for the partial hydrogenation of cycloienes to monoenes; for example, the catalytic activity in hydrogenation of cyclopentadiene is 10-100 times higher than those of other supported catalysts reported in literature. This high catalytic activity is believed to be due to the fact that immobilization via coordination capture can create favorable conditions for easy access to the substrates, preventing the colloidal particles from **aggregating** and thus forming a well dispersed catalyst. The selectivity to cyclopentene reached 99%, and a 100% selectivity for the partial hydrogenation of cis,cis-1,3-cyclooctadiene was obtained. Narrowly dispersed ultrafine **palladium metal particles** with the modification of anchored thioether **ligands** is thought responsible for catalyst selectivity. During the course of catalytic reaction, the amts. of metal leaching are within the magnitude of ppb, and the total turnover nos. are larger than 80000. Furthermore, this new route for catalyst prepn. via coordination capture of **metal colloids** provides an approach to controlling or adjusting the **particle** size of **metal particles** within 1-10 nm. This makes possible the inspection of the influences of different sulfur-contg. groups anchored on supported surface on the catalytic behaviors. In the partial hydrogenation the highest selectivity and activity were obtained when the n-Pr thioether **ligand** was used. It can be expected that the new route for catalyst prepn. will play an important role in the study of the interaction between the **metal particles** and supports.

L34 ANSWER 121 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 115:145371 CA

TI Optical plasmon losses in **stabilized gold (Au55) clusters**

AU Fauth, K.; Kreibig, U.; Schmid, G.

CS Univ. Saarlandes, Saarbruecken, W-6600, Germany

SO Zeitschrift fuer Physik D: Atoms, Molecules and Clusters (1991), 20(1-4), 297-300

AB Au55 cluster compds. were investigated by optical spectroscopy and TEM. The optical spectra appear to be rather structureless, neither showing a collective excitation resonance nor exhibiting distinct absorption bands known from lower nuclearity clusters. Discussed are changes of the electronic properties compared to larger **Au clusters** affecting both, 6sp electrons and 5d-6sp interband transitions, the cluster-**ligand**-interaction being considered as a charge transfer process. A low temp. instability was obsd. in the cluster compd., which results in changed optical extinction spectra. A characteristic absorption feature at  $\lambda = 400$  nm is attributed to small, **ligand-free Au cluster** fragments.

L34 ANSWER 122 OF 151 CA COPYRIGHT 2006 ACS on STN

AN 114:93957 CA

TI Molecular structure of  $\{[Ag_{13}(\mu-SC_5H_9NHMe)_{16}]_{13+}\}_n$ , a novel one-dimensional nonmolecular **silver-thiolate**

AU Casals, Isidre; Gonzalez-Duarte, Pilar; Sola, Joan; Vives, Josep; Font-

Bardia, Merce; Solans, Xavier  
 CS Dep. Quim., Univ. Auton. Barcelona, Barcelona, 08193, Spain  
 SO Polyhedron (1990), 9(5), 769-71  
 AB The polymeric structure of  $\{[Ag_{13}(\mu-L)_{16}]_{13+}\}_n$  (HL = 1-methylpiperidine-4-thiol) contains  $Ag_{10}S_{16}$  units linked by 3 Ag atoms. Each unit consists of a central  $Ag_6(\mu-L)_6$  core and 2  $Ag_4(\mu-L)_4$  rings and comprises diagonal, trigonal, and tetrahedral Ag and doubly- and triply-bridging S atoms. Crystal structure is triclinic, space group P.hivin.1, a 21.129 (4), b 20.383, c 15.172(3) Å,  $\alpha$  121.59(3),  $\beta$  114.53(4),  $\gamma$  96.21(3)°, Z = 9, R = 0.093, and R = w 0.096.

L34 ANSWER 130 OF 151 CA COPYRIGHT 2006 ACS on STN  
 AN 109:103547 CA  
 TI Large transition metal clusters-VI. Ligand exchange reactions on the gold triphenylphosphine chloro cluster,  $Au_{55}(PPh_3)_{12}Cl_6$  - the formation of a water soluble gold ( $Au_{55}$ ) cluster  
 AU Schmid, Guenter; Klein, Norbert; Korste, Ludger; Kreibig, Uwe; Schoenauer, Detlev  
 CS Inst. Anorg. Chem., Univ. Essen, Essen, D-4300/1, Fed. Rep. Ger.  
 SO Polyhedron (1988), 7(8), 605-8  
 AB  $Au_{55}(PPh_3)_{12}Cl_6$  is sol. in org. solvents like pyridine or  $CH_2Cl_2$  but decomps. rapidly, thus precluding crystal growth and other studies. Exchange of  $PPh_3$  in  $Au_{55}(PPh_3)_{12}Cl_6$  by  $Ph_2PC_6H_4SO_3Na$  takes place quant. and yields stable water-sol.  $Au_{55}(Ph_2PC_6H_4SO_3Na.2H_2O)_{12}Cl_6$ . Mol. wt. detns. and cond. measurements in  $H_2O$  show that the cluster is completely dissocd. into  $12Na^+$  and  $[Au_{55}(Ph_2PC_6H_4SO_3)_{12}Cl_6]^{12-}$ . From such aq. solns. very small, probably cryst. particles are obtained which can, in the dried state, be obsd. in the transmission electron microscope using a 100 kV electron beam. Images are given that show columns or layers of cluster mols. with a distance of  $2.1 \pm 0.1$  nm. The diams. of a cluster mol. including the ligand shell and of the naked cluster are calcd. as  $2.2 \pm 0.1$  and 1.3-1.4 nm, resp. The cluster mols. forming the layered structures are intact. This is the 1st time that  $M_{55}$  clusters could be imaged with an intact ligand shell by TEM. Earlier microscopic studies with a 400 kV beam gave high resoln. images of the cluster nuclei only.

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